

Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, DC 20554

In the Matter of	)	
	)	
	)	
Service Rules for Advanced Wireless Services in the	)	WT Docket No. 12-70;
2000-2020 MHz and 2180-2200 MHz Bands	)	
	)	
Fixed and Mobile Services in the Mobile Satellite	)	ET Docket No. 10-142;
Service Bands at 1525-1559 MHz and 1626.5-	)	
1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500	)	
MHz, and 2000-2020 MHz and 2180-2200 MHz	)	
	)	
Service Rules for Advanced Wireless Services in the	)	WT Docket No. 04-356
1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz	)	
and 2175-2180 MHz Bands	)	

To: The Commission

**COMMENTS OF THE DECT FORUM**

May 17, 2012

**TABLE OF CONTENTS**

I.	About the DECT Forum.....	1
II.	1915-1920 MHz should be reallocated to the UPCS band .....	2
III.	Migration of cordless telephones .....	3
IV.	Significant Band Trends .....	4
V.	High reliability applications need unlicensed spectrum .....	7
VI.	DECT standards support new needs with ongoing development .....	11
VII.	Importance of continued spectrum etiquette refinement .....	17
VIII.	Conclusions.....	17

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**COMMENTS OF THE DECT FORUM**

The DECT Forum submits these comments on the *Public Notice* (PN) in the above captioned proceeding.<sup>1</sup>

**I. ABOUT THE DECT FORUM**

The DECT Forum is an international industry association embracing suppliers and operators of DECT based terminals, systems, and networks. DECT stands for "Digital Enhanced Cordless Telecommunications" and denotes a radio technology suited for voice data and

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<sup>1</sup> Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands; Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5- 1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands, *Notice of Proposed Rulemaking, Notice of Inquiry*, FCC 12-32, WT Docket No. 12-70, ET Docket No. 10-142, WT Docket No. 04-356 (Mar. 21, 2012) ("Notice").

networking applications with range requirements up to a few hundred meters. The DECT Forum represents the interests of the DECT industry with the following primary objectives:

- To promote DECT as the worldwide cordless communication standard.
- To pursue worldwide harmonization of frequencies for DECT products.
- To provide an interactive forum for sharing information and experience between regulatory and standardization agencies, operators, users and manufacturers.
- To manage the evolution of DECT so as to protect legacy investments and permit orderly service migration and expansion.

## **II. 1915-1920 MHZ SHOULD BE REALLOCATED TO THE UPCS BAND**

The DECT Forum supports the suggestion that 1915-1920 should be reattached to the UPCS band. The Commission has suggested that returning 1915-1920 MHz to the UPCS band is an option being considered:

*“.... we seek comment on whether the Commission should convert the 1915-1920 MHz band to unlicensed use, perhaps by adding it to the existing UPCS band. Unlicensed use, among other things, might provide additional capacity for devices using the ETSI DECT standard, including cordless phones and wireless microphones.”<sup>2</sup>*

The UPCS band serves an important and growing function among unlicensed bands. Its spectrum etiquette, combined with the many advantages of the DECT protocol, make it the band of choice for high reliability services, particularly real-time services, such as cordless telephones. As other bands become increasingly crowded more services,

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<sup>2</sup> Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands; Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5- 1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands, *Notice of Proposed Rulemaking, Notice of Inquiry*, FCC 12-32, WT Docket No. 12-70, ET Docket No. 10-142, WT Docket No. 04-356 (Mar. 21, 2012) (“Notice”) § 147.

particularly those that require a high level of reliability, e.g. medical devices, power plants, first responder equipment, need a band that offers a high degree of interference protection.

### **III. MIGRATION OF CORDLESS TELEPHONES**

The almost complete migration of cordless phones to the UPCS band is both instructive and predictive of the need for unlicensed bands with a high degree of interference protection. Over the years cordless phones have used a number of frequency bands and RF protocols. Early cordless phones used frequencies near 50 MHz. Later, growing demand found the 900 MHz Industrial, Scientific and Medical (ISM) band coming into common use in order to provide additional frequencies in which to operate. More recently the 2.4 and 5.8 GHz ISM band came into common use and grew to dominate as the frequency bands of choice for cordless phones. However, in recent years DECT 6.0, operating in the UPCS band has been growing strongly and is supplanting all the other frequency bands and RF protocols. Today over 70% of the cordless phones sold in the US use the UPCS band using the DECT 6.0 RF protocol. Most major manufacturers have moved all future development to the UPCS band.

Over the years seven frequency bands have been used by cordless phones. These are:

- 1.7 MHz  
(1.64 MHz to 1.78 MHz. This band had up to 5 Channels and was used by analog cordless phones.)
- 43–50 MHz  
(Base: 43.72-46.97 MHz, Handset: 48.76-49.99 MHz, allocated in 1986 for 10 channels, and later 25 Channels, FM System)
- 900 MHz  
(902–928 MHz. Allocated in 1990.)
- 1.9 GHz  
(1920-1930 MHz. Rule changes in 2004 made this band available for general consumer cordless phones, using the DECT 6.0 standard. In Europe, Australia, Asia and Africa uses DECT uses 1880-1900.)

- 2.4 GHz  
(Allocated in 1998, this became a very popular band for cordless phones.)
- 5.8 GHz  
(Allocated in 2003 due to crowding on the 2.4 GHz band this band saw many cordless phones introduced but later lost popularity after the UPCS band became available).

The migration to the UPCS band has largely been prompted by band-crowding and the resulting increase in interference and customer complaints in the ISM bands. The availability of the DECT protocol offered both technological advantages but also significant development and marketing advantages, such as the availability of low cost chips and components, development tools and support and an internationally recognized standard with a reputation for excellence. This combination is proving to offer overwhelming advantages for cordless phone manufacturers and increasingly manufacturers of other product categories.

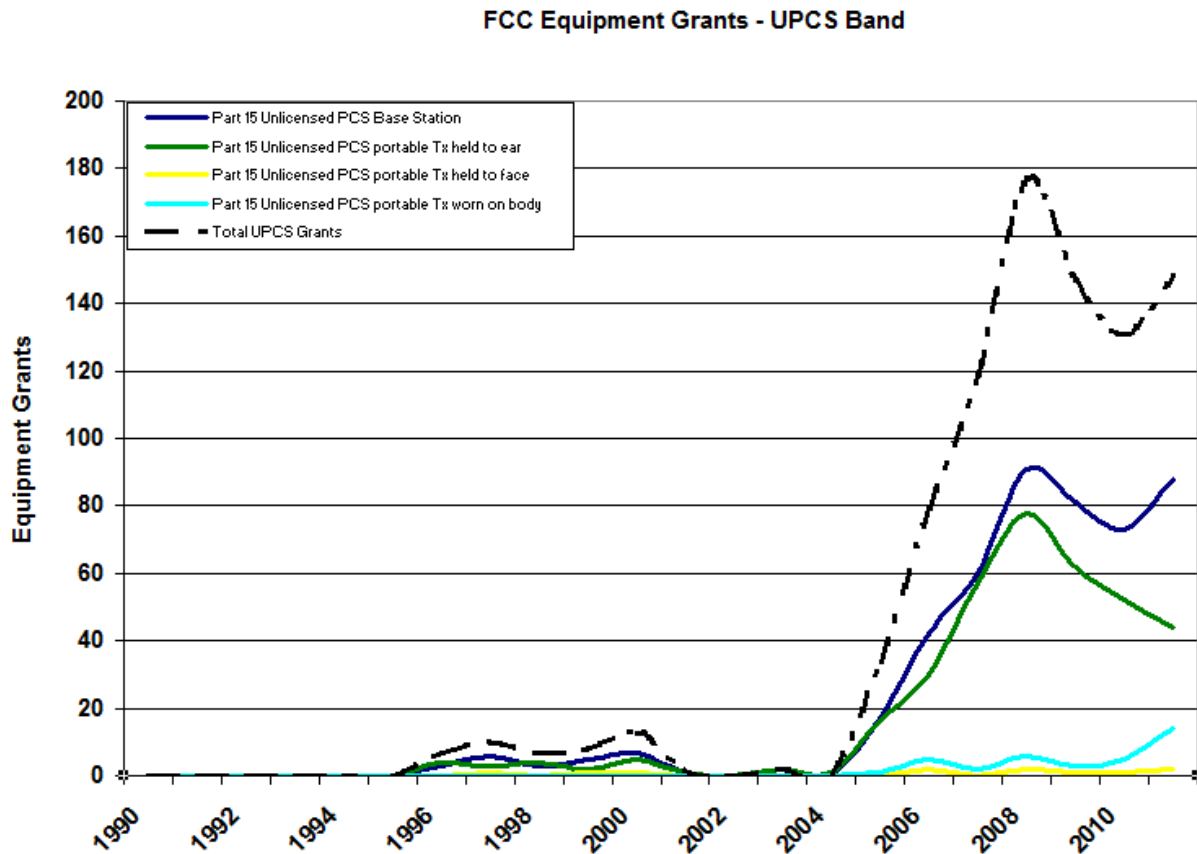
#### **IV. SIGNIFICANT BAND TRENDS**

Regulatory changes can result in major shifts in what bands and RF technologies are used. An example can be seen in regulatory changes made in 2004-2005 by the FCC in the UPCS band. A 2004 FCC rulemaking, revising the rules governing the Unlicensed Personal Communications Services (UPCS) band,<sup>3</sup> allowed DECT to first operate in the band. This action combined with the elimination of a provision restricting portable equipment from using the band, which was done in April 2005, effectively allowed consumer devices into the band for the 1<sup>st</sup>

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<sup>3</sup> FCC R&O 04-219, *Sixth Report And Order, Third Memorandum Opinion And Order, And Fifth Memorandum Opinion And Order*, Adopted: September 9, 2004

time.<sup>4</sup> The result, seen in Figure 1, was an explosion in activity. Today over 70% of all cordless phones in the US use this band.<sup>5</sup>



**Figure 1 - FCC Equipment Grants for UPCS Frequency Band**

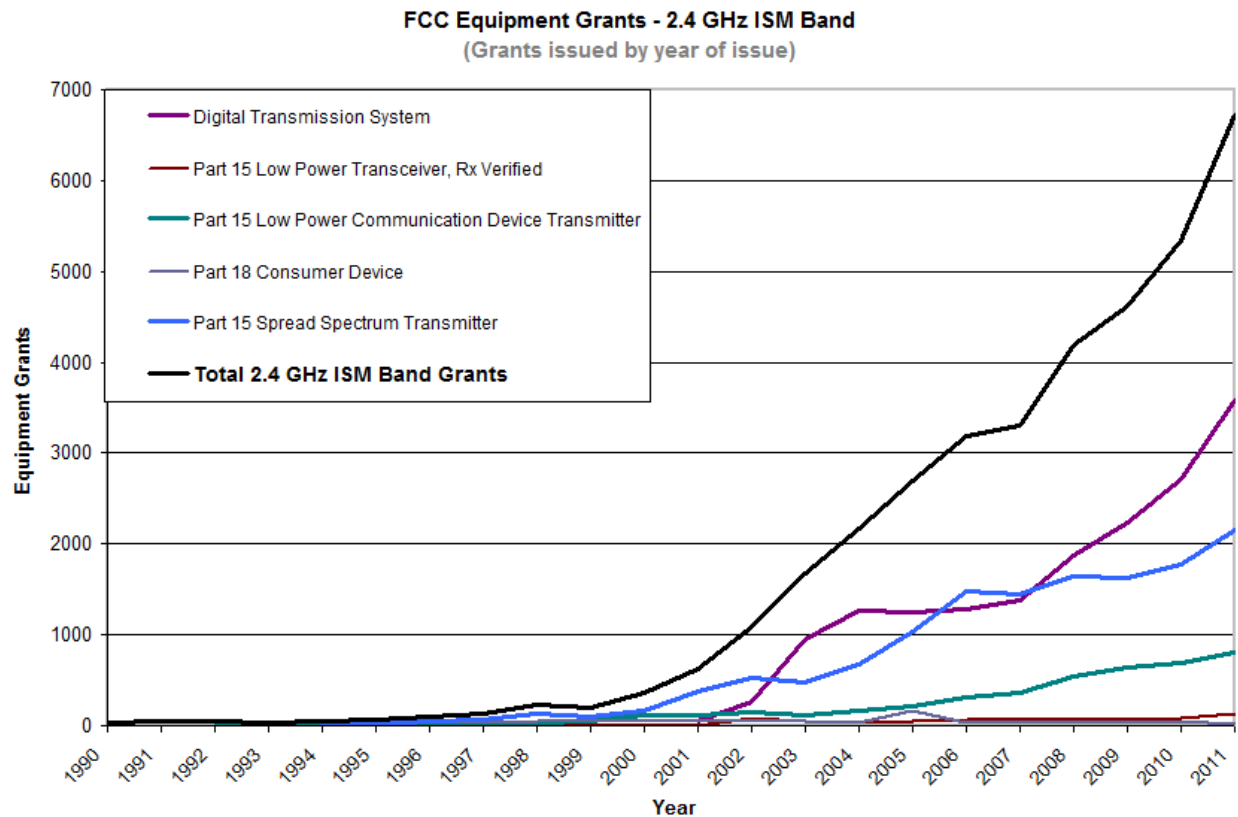
As shown by Figure 1 the UPCS Band Equipment Grants exploded after the 2004 rule change.

At the same time that the UPCS band has grown the other ISM bands have also enjoyed dramatic growth. In the case of the 2.4 GHz ISM band the growth is even more dramatic.

<sup>4</sup> FCC Public Notice DA 05-1005, *Unlicensed PCS Devices Will No Longer Be Subject To Coordination Requirements After April 4, 2005*, Released: April 4, 2005

<sup>5</sup> A study released July 17, 2008 of cordless telephone sales in the United States in May 2008 found that UPCS band devices, using the DECT 6.0 standard accounted for 53 percent of the market. See Press Release, DECT 6.0 Reaches 53% of the Total Cordless US Market, available at: <http://www.dect.org/news.aspx?id=34>.

Figure 2 shows the dramatic growth of the 2.4 GHz ISM band. This growth is both a tribute to the success of that band and the standards that use it but also is predictive of increasing problems with band crowding and interference.

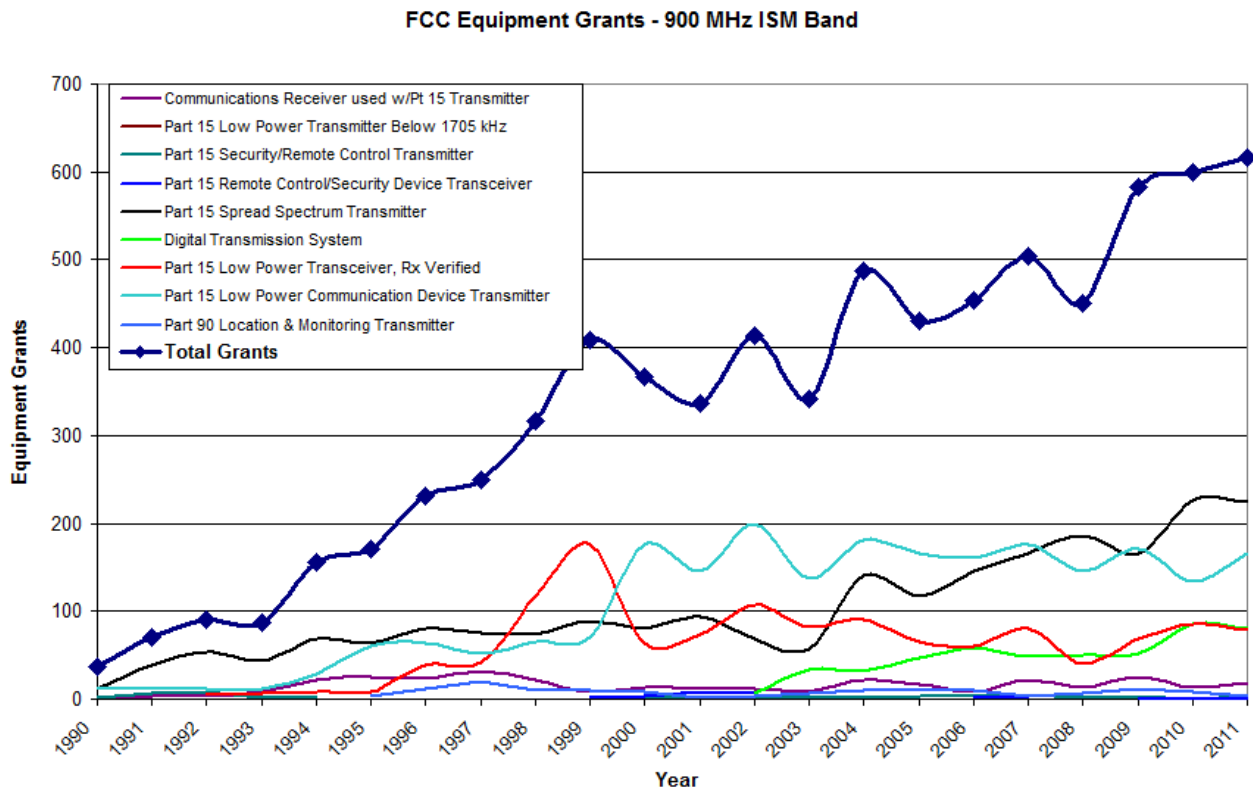


**Figure 2 – Growth of FCC Equipment Grants in the 2.4 GHz ISM Band**

Figure 3 shows a similar but somewhat less dramatic growth in the 900 MHz band. Also apparent in this band is some leveling off of growth, perhaps as the band approaches its saturation point. Other unlicensed ISM bands show similar trends with many showing signs of saturation and the resulting leveling off of use.

Taken together these trends show the strong market demand for unlicensed spectrum. The trends also predict increasing problems with band crowding and congestion. For services that require a high degree of reliability this is troubling. It seems clear that these societally

important services need unlicensed operating spectrum with service rules consistent with their need for reliability. The expansion of the UPCS band offers exactly this remedy.



**Figure 3 – Growth of FCC Equipment Grants in the 900 MHz ISM Band**

## **V. HIGH RELIABILITY APPLICATIONS NEED UNLICENSED SPECTRUM**

The mass movement of cordless phones to the UPCS band is best understood as an early indicator of the increasing need of high reliability applications for unlicensed spectrum that has a high degree of interference protection. Cordless phones would be predicted to be among the first high reliability devices to manifest this need because they are deployed in very large numbers, in a wide variety of use environments and they are used a lot. Further, the manifestation of interference is obvious; the voice of the person you are in conversation with is interfered with. This combination of factors means that cordless phones will be among the first real-time, high reliability services to identify interference problems.

A review of the FCC equipment grants for the UPCS band reveals a growth number of high reliability applications moving to the UPCS band. Motorola and Safety 1st recently introduced audio baby monitors using the UPCS band for wireless connectivity, Figure 4 and Figure 5. Such monitors are clearly applications where anyone would want the upmost in reliability and interference protection.



**Figure 4 - Motorola baby monitor<sup>6</sup>**



**Figure 5 – Safety 1<sup>st</sup> Wee Hear monitor<sup>7</sup>**

DECT is also finding increasing use as a wireless component in healthcare products. Ascom is one company offering DECT as part of a hospital enterprise solution, integrating clinical, management, financial and technical systems.

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<sup>6</sup> FCC ID VLJ80-8623-00

<sup>7</sup> FCC ID VLJ80-8623-00



**Figure 6 – Ascom captions its DECT 6.0 Healthcare products  
“When Every Second Counts”**

The wireless component improves mobility and data delivery. In addition, better process efficiency reduces time to improve the quality of care. Patients receive better information and quicker response to medical alarms. These benefits have the potential to save lives.

Other innovative healthcare applications are being introduced for hospital enterprise management, elder care and assisted living and home tele-health applications.



**Figure 7 – Healthcare Wristband or Pendant<sup>8</sup>**

First responder equipment is another growing application for the UPCS band. Firecom uses DECT 6.0 for its wireless, under-the-helmet system, Figure 8.

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<sup>8</sup> NEC Philips M155 DECT Messenger, healthcare watch or pendent

[http://www.nec-ipdect.com/sheets/M155\\_messenger.pdf](http://www.nec-ipdect.com/sheets/M155_messenger.pdf)



**Figure 8 – Firecom's DECT 6.0 Headsets for 1<sup>st</sup> Responders and Emergency Personnel<sup>9</sup>**



**Figure 9 – DECT 6.0 used in a Hazmat Communication System<sup>10</sup>**

<sup>9</sup> <http://www.firecom.com>

<sup>10</sup> Ceotronics Hazmat communications system

CeoTronics systems, Figure 9, and Polycom's KIRK 4080 handset, Figure 10, were developed for use by firefighters and others working in potentially explosive environments. This is another example of a class of products where interference free communication is a high priority.



**Figure 10 – Polycom firefighters handset<sup>11</sup>**

## **VI. DECT STANDARDS SUPPORT NEW NEEDS WITH ONGOING DEVELOPMENT**

The DECT standards are not static but a dynamic family of standards. In recent years the DECT standards have added support for high definition voice, integrated voice and data services and low energy transmissions. These changes came in response to specific needs, illustrating the expanding role of DECT protocol devices.

High definition voice is a major step forward in recent years. Traditional telephony was limited to a guaranteed 3 kHz, although in reality analog telephony often provides much wider bandwidth. With the introduction of digital technologies and particularly wireless transmission, with bandwidth sensitivities, the 3 kHz bandwidth became much more strictly controlled. The result has been low quality voice. The loss of full voice fidelity affects all users, particularly in noisy environments where the sensitivity to background noise is much higher than when provided with high definition, full bandwidth voice.

For people with hearing loss the 3 kHz bandwidth limitation of voice is particularly impacting. Loss of the full voice bandwidth means that a person receives less acoustic

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<sup>11</sup> FCC ID M72-PKK002

information and coupled with their own hearing loss the result is that conversations are much harder to understand. For people with hearing loss the availability of high definition voice is extremely important.

High definition voice has been put into the DECT standards and products supporting it are already shipping. However, transmitting high definition voice requires more bandwidth. In response to a petition from the DECT Forum the Commission saw fit to modify the rules for the UPCS band in March of 2012.<sup>12</sup> By this action the Commission insured the unhindered deployment of high definition voice products in the UPCS band. A consequence of this positive development will be that the band will be even more heavily used and systems increasingly move to provide consumers with improved voice quality.



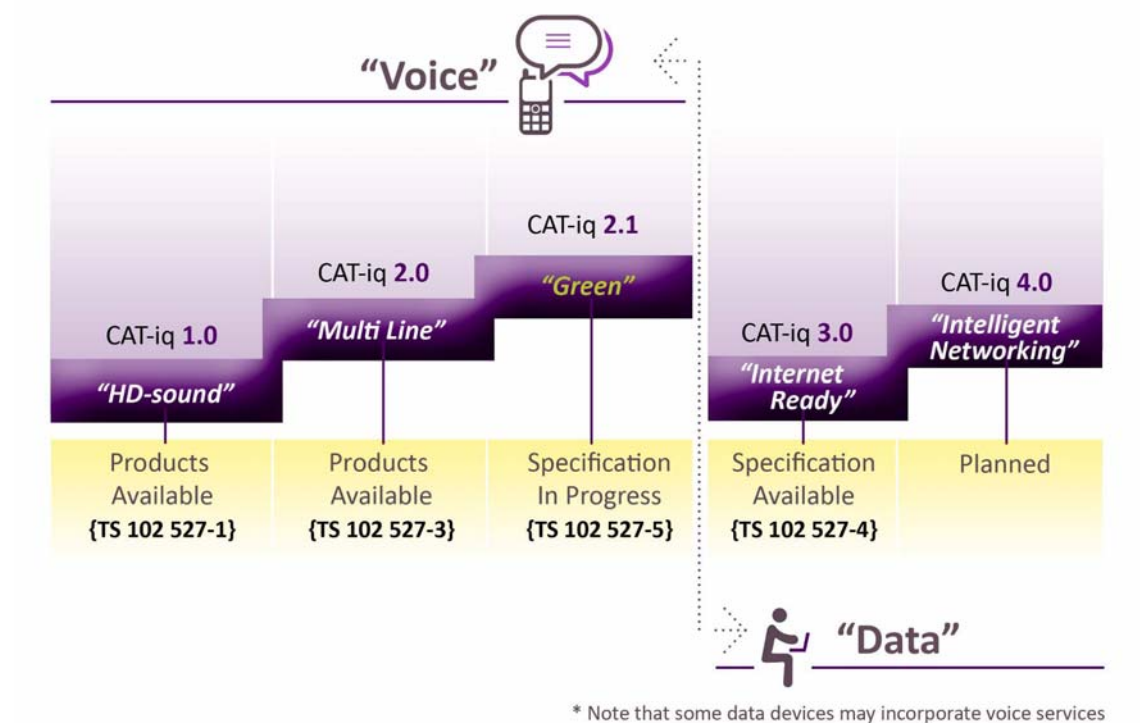
**Figure 11 – CAT-iq logo**

CAT-iq technology was launched at the ITU Telecom World 2006 in Hong Kong in December 2006, responding to the growing need for integration of voice and data services in a high quality environment. CAT-iq stands for Cordless Advanced Technology –

internet and quality. While CAT-iq is positioned as a broadband telephony application, it embraces technology convergence with other application fields. The DECT Forum is responsible for the DECT/CAT-iq industry and is guiding its development and the certification of the CAT-iq products. CAT-iq is designed for the next generation of IP-voice and IP-radio services, with plans for migration into the home gateways, enabling consumers to manage their home communication, information and entertainment needs.

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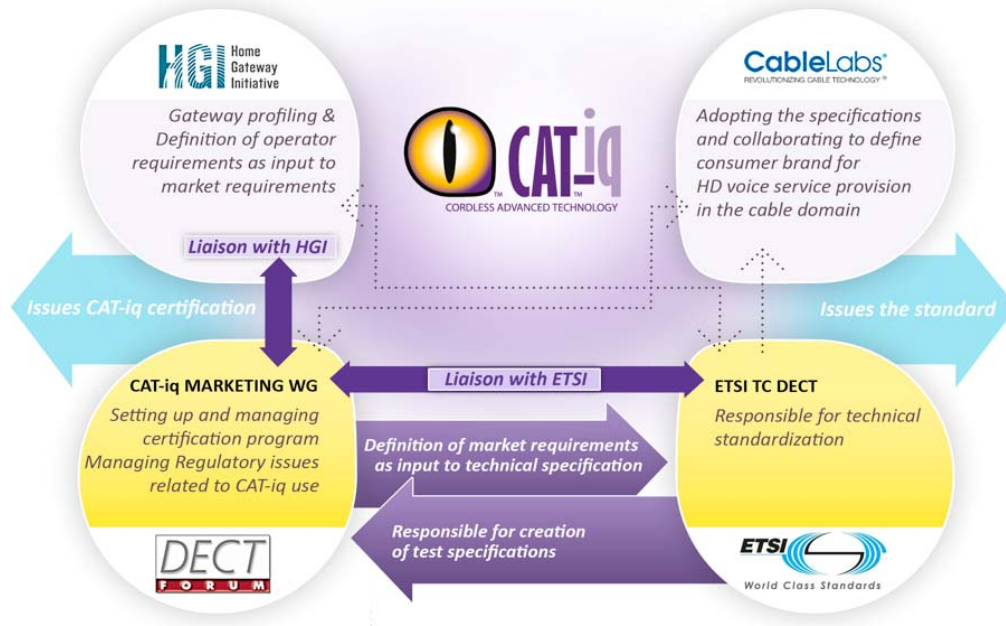
<sup>12</sup> FCC 12-33.



**Figure 12 – DECT CAT-iq development roadmap**

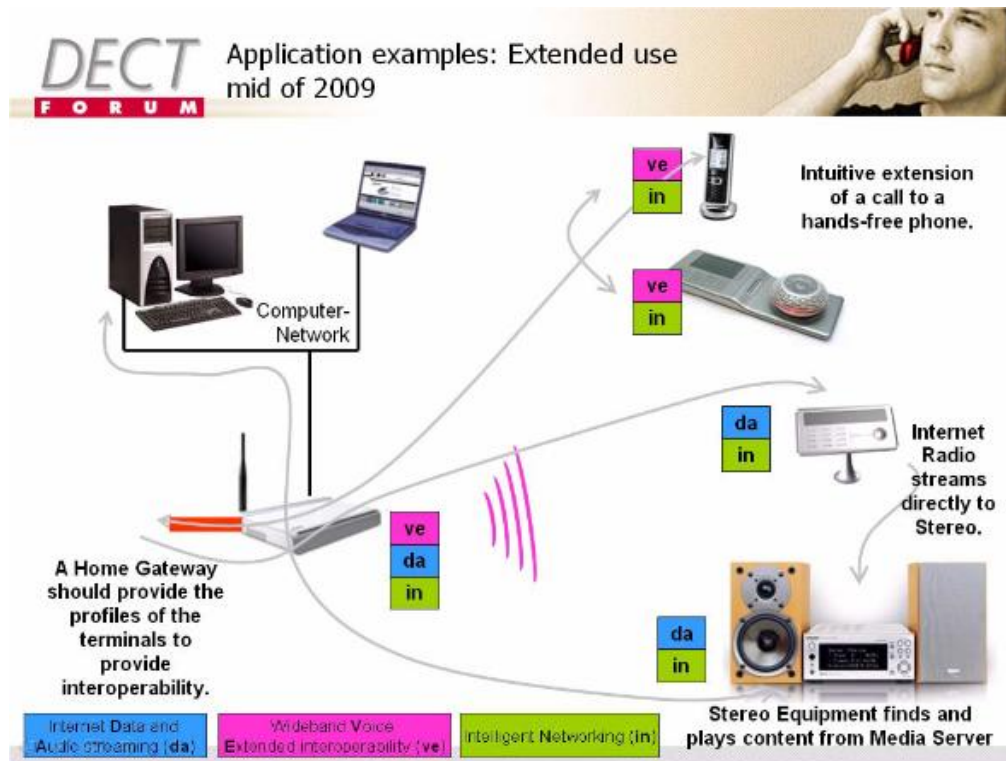
Figure 12 shows the roadmap and current status of CAT-iq standards.

Organizationally DECT CAT-iq is a collaborative effort of multiple organizations. The DECT Forum represents the DECT/CAT-iq industry, including equipment manufacturers and chip suppliers. It drives the certification program to guarantee interoperability and promotes the technology globally. The Home Gateway Initiative is the industry association for major operators. CableLabs brings the cable operators views and seeks to insure that CAT-iq meets the needs of the cable industry. It advises and supports prioritization of use cases and feature sets of new technologies and interoperability. The European Telecommunications Standards Institute (ETSI) creates the standards and test specifications for the certification programs.



**Figure 13 – CAT-iq is being developed by an international, multi-party endeavor**

Figure 14 presents typical home applications. As DECT CAT-iq continues to develop new applications and support other fields will be added. The UPCS band and DECT CAT-iq create a compelling solution for applications that require a high level of interference protection and assured access for communication.

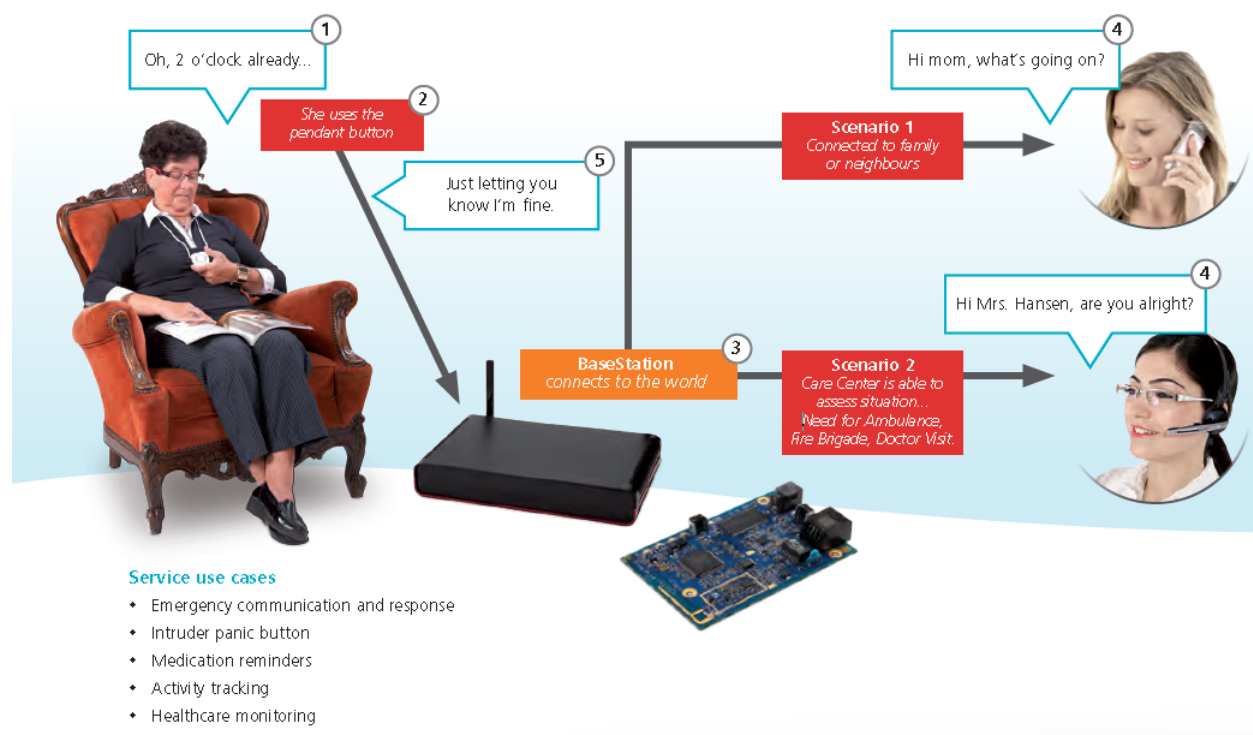


**Figure 14 – Examples of Home Applications using DECT**

DECT ULE (Ultra Low Energy) is another innovative development in the DECT family of standards. DECT ULE is optimized for low data rate applications. It is primarily intended to support the needs of sensor and control devices. DECT ULE devices also support CAT-iq to integrate those service profiles, such as providing voice connectivity, when required. The emphasis on quality-of-service (QoS) is a distinctive of DECT ULE, when compared to other low energy services. The low energy (ULE) version of DECT positions it to serve the fast growing and increasingly important machine-to-machine (M2M) market segment. DECT ULE devices will be mainly used for short communications (<500bytes/message) but these systems will often be required to handle a very large number of devices (>400 devices/base). Low frame rates video is part incorporated in some applications such as door monitors in security systems, industrial control and sensor systems and or patient monitors in healthcare. In home use baby monitors are an application where low frame rate video provides benefits. In these applications

the need for reliable, interference protected service. However, the great value of the protection afforded by the UPCS band's spectrum etiquette could be undone if band crowding is allowed to become an issue. It is for this reason that the opportunity to expand the band by adding 1915-1920 MHz is so important.

The first interoperability tests were conducted by the DECT Forum in June 2011. In September 2011 Dialog Semiconductor announced the first commercially available DECT ULE devices. The initial devices illustrate the potential for DECT ULE devices to serve the home automation and home healthcare fields, as well as commercial and industrial sensor and control systems.



**Figure 15 – Dialog Semiconductor's emergency communicator reference design<sup>13</sup>**

<sup>13</sup> Illustration from "Emergency communicator reference design product brief" at URL:

<http://www.dialog-semiconductor.com/smartpulse.php>

## **VII. IMPORTANCE OF CONTINUED SPECTRUM ETIQUETTE REFINEMENT**


The interference protection provided by the UPCS band spectrum etiquette is a primary reason for its success. This etiquette brought together several interference management mechanisms such as a fixed frame time for all UPCS devices, a listen-before-talk and least-interfered-channel protocol. These techniques support the needs of high reliability devices. But this etiquette has not been static; in fact its ongoing development has been a significant contributor to its success. The original service rules for the band did not attract many companies to use the band. That changed dramatically with the changes made in the 2004-2005. More recently the Commission has just modified the spectrum etiquette rules for the UPCS band making it even more robust. This action by the Commission increases the effectiveness of the UPCS band spectrum etiquette. It also shows that etiquettes can be modified, enhanced and adapted over time to be increasingly effective and responsive to changes both in the UPCS band and neighboring bands. History has shown insightful management of the band, responding to changing needs and conditions, has been a fundamental contributor to its growing success and increasing importance. The DECT Forum believes that the time is right for returning 1915-1920 MHz to the UPCS band and insure its continued growth. Perhaps most importantly adding this frequency block insures that critical applications, that require the utmost in reliability and interference protection have a place to operate in unlicensed spectrum.

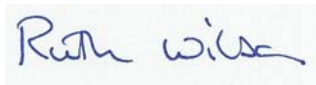
## **VIII. CONCLUSIONS**

For the foregoing reasons the DECT Forum encourages the Commission to return the 1915-1920 MHz block to the UPCS band and release it to add its value to the already substantial service UPCS band provides. The growth of the UPCS band makes clear that in a growing number of locations more channels will be needed. The growth of other unlicensed bands and

they dominate usage will place increasing pressure on reliability sensitive applications to find operating spectrum that is interference protected and which can support assured connectivity. The UPCS band is the best option for this important class of applications and deserves the bandwidth to support the growing needs of these devices.

Respectfully submitted,  
**DECT FORUM**

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